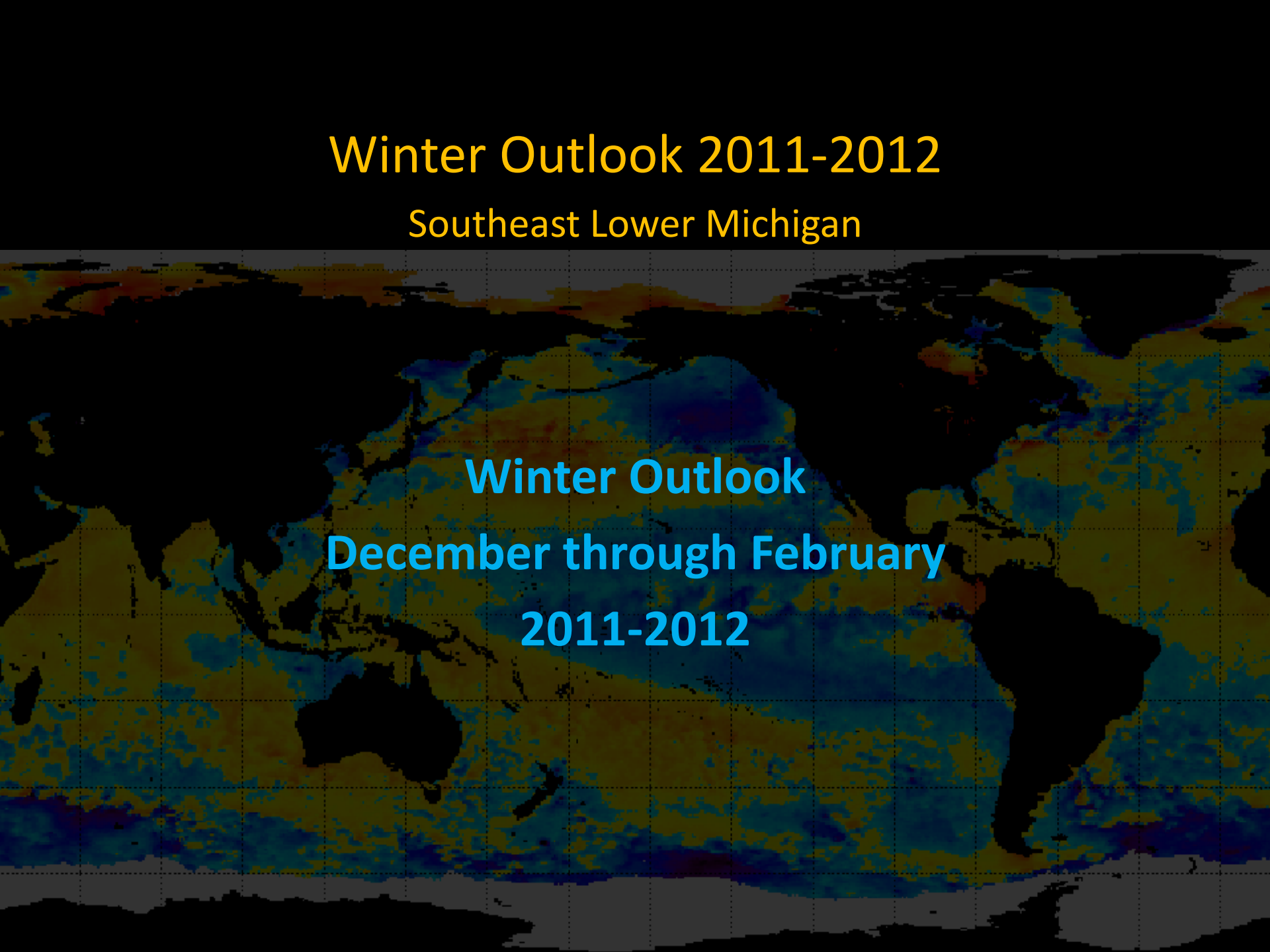


Winter Outlook 2011-2012

Southeast Lower Michigan

A world map is visible in the background, rendered in a dark blue and black color scheme. A light gray grid of latitude and longitude lines is overlaid on the map. The map shows the continents of North America, South America, Africa, Europe, and Asia.

**Winter Outlook
December through February
2011-2012**

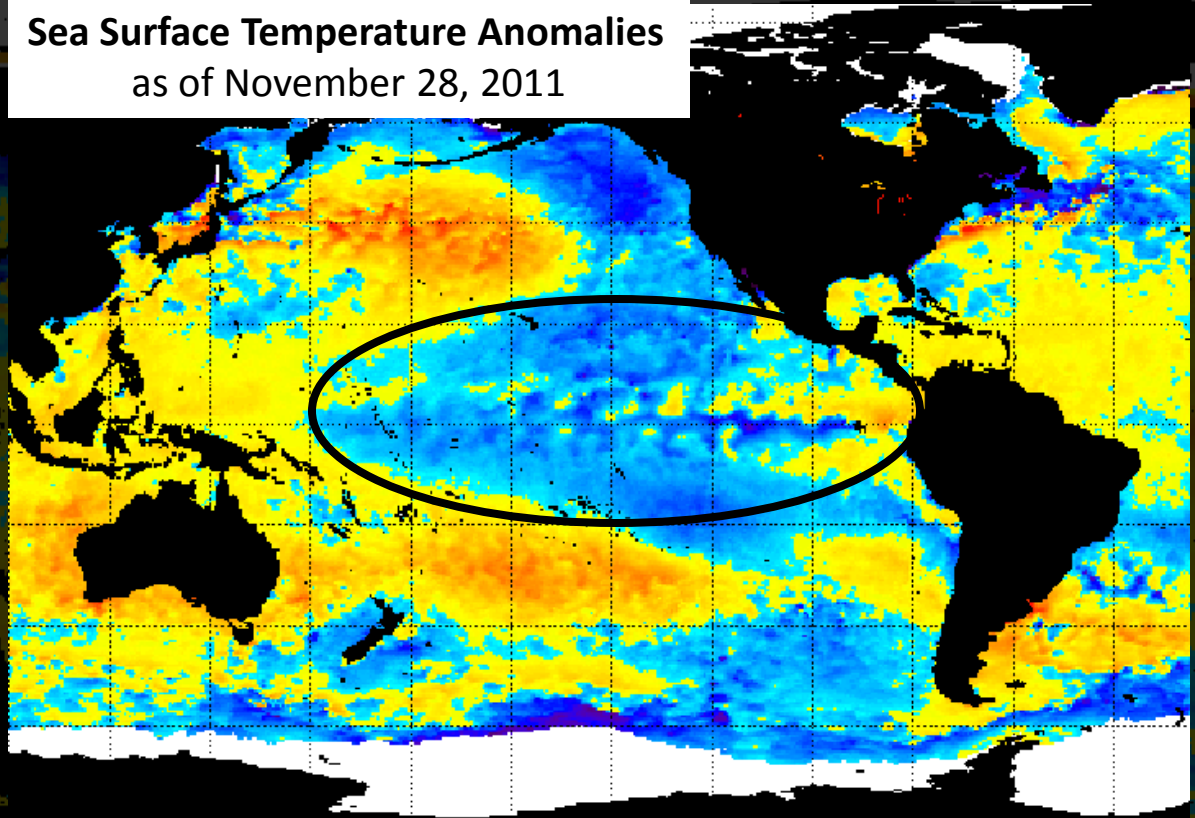
Current Conditions

SST Anomalies

In this map of sea surface temperature anomalies, La Nina conditions are clearly present in the tropical pacific as of November 28th

The most recent departures from normal range from -0.6°C to -1.0°C , which is firmly within the weak to borderline moderate range.

Sea Surface Temperature Anomalies
as of November 28, 2011



For the latest ENSO conditions, visit the Climate Prediction Center's (CPC) [ENSO page](#)

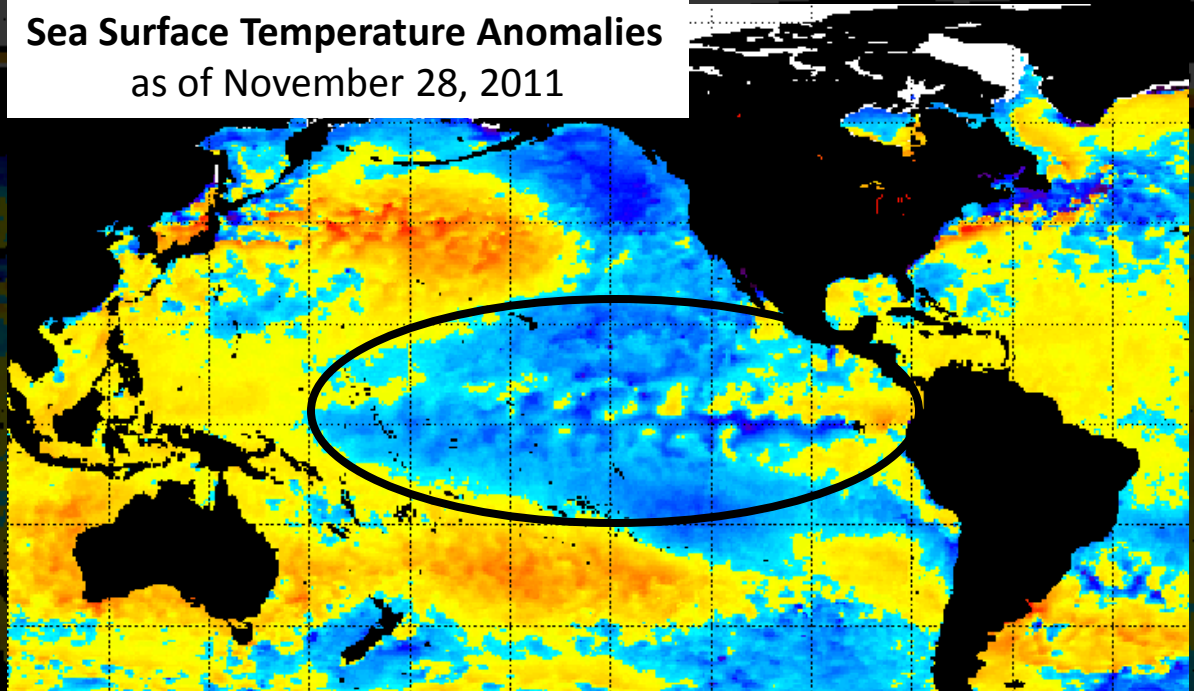
Current Conditions

MEI Ranking

The multivariate ENSO index (MEI) is a more holistic index than looking at sea surface temperatures alone. It's calculation takes into account other important variables, including sea level pressure and the strength of the trade winds in the tropics.

How does the strength of *this* year's la Nina compare to *last* year's event?

Sea Surface Temperature Anomalies
as of November 28, 2011



2010 la Nina: **2nd** strongest (for this time of year)

2011 la Nina: **14th** strongest for the time of year

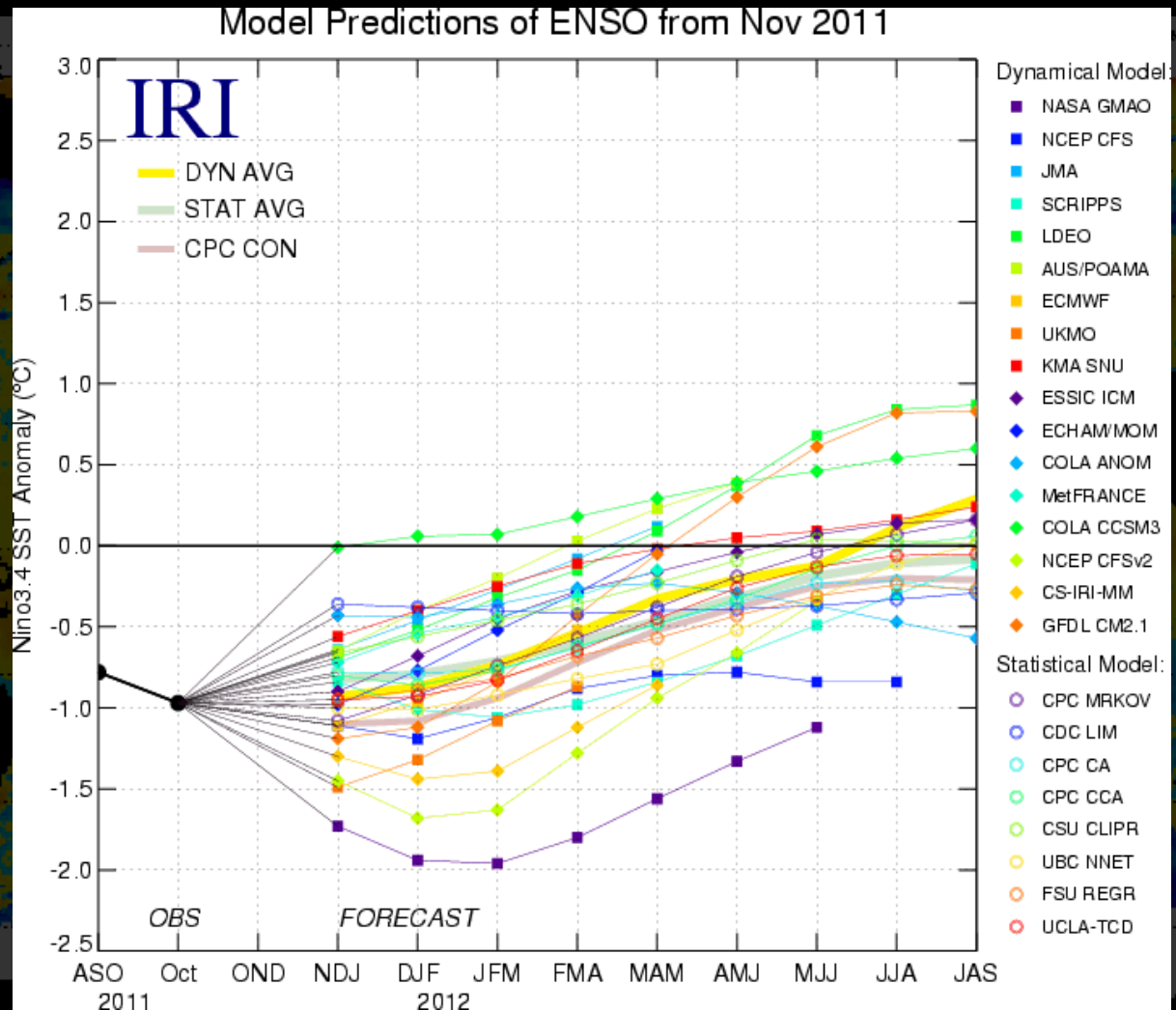
For the latest MEI Rankings, see [here](#)

ENSO Forecast

Where do we go from here?

The model plume on the right shows strong agreement among the models that la Nina conditions will persist. The outlook from the NWS's Climate Prediction Center (solid light red) is for a borderline moderate strength la Nina.

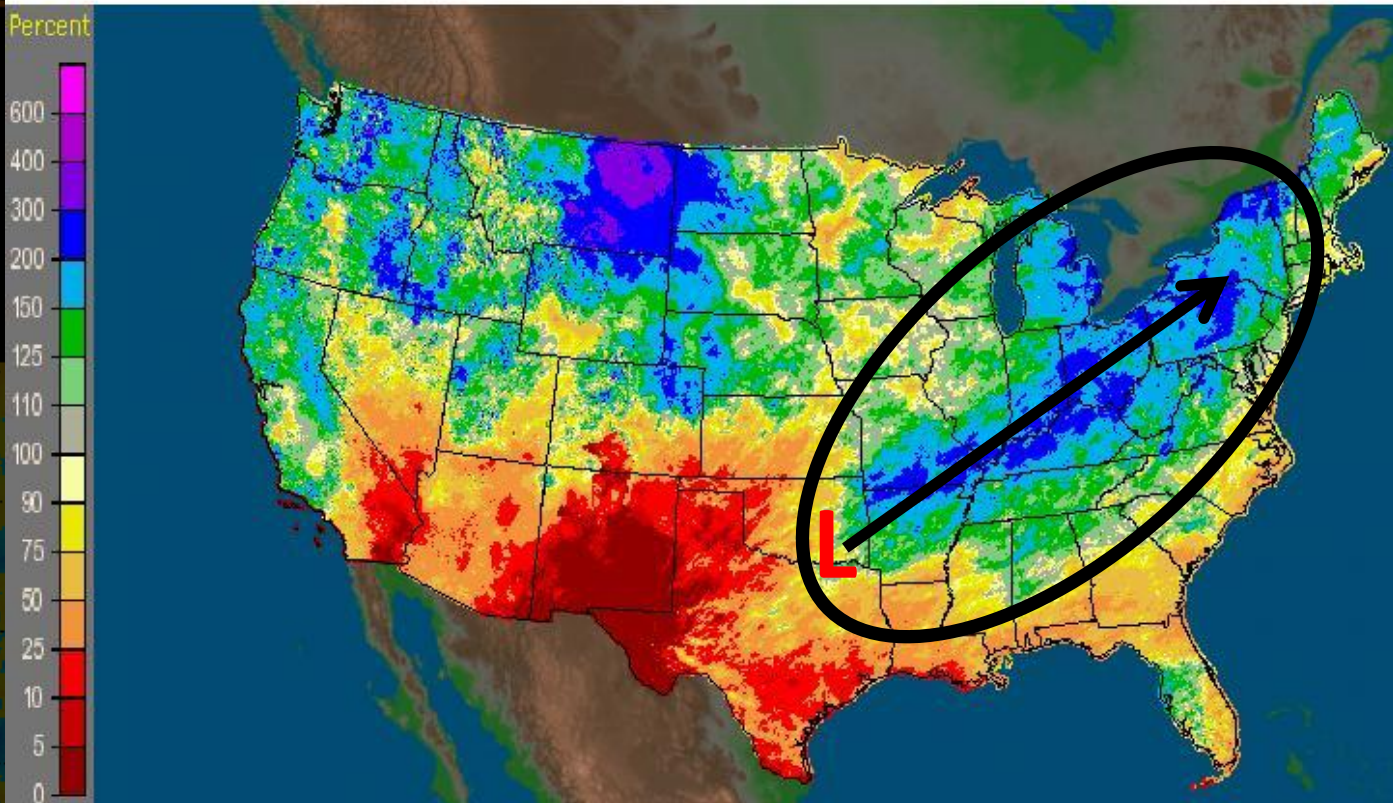
For the latest ENSO plume, visit the International Research Institute for Climate and Society [here](#)



A Look Back

Spring 2011

CONUS + Puerto Rico: Current 90-Day Percent of Normal Precipitation
Valid at 5/28/2011 1200 UTC- Created 5/28/11 23:40 UTC

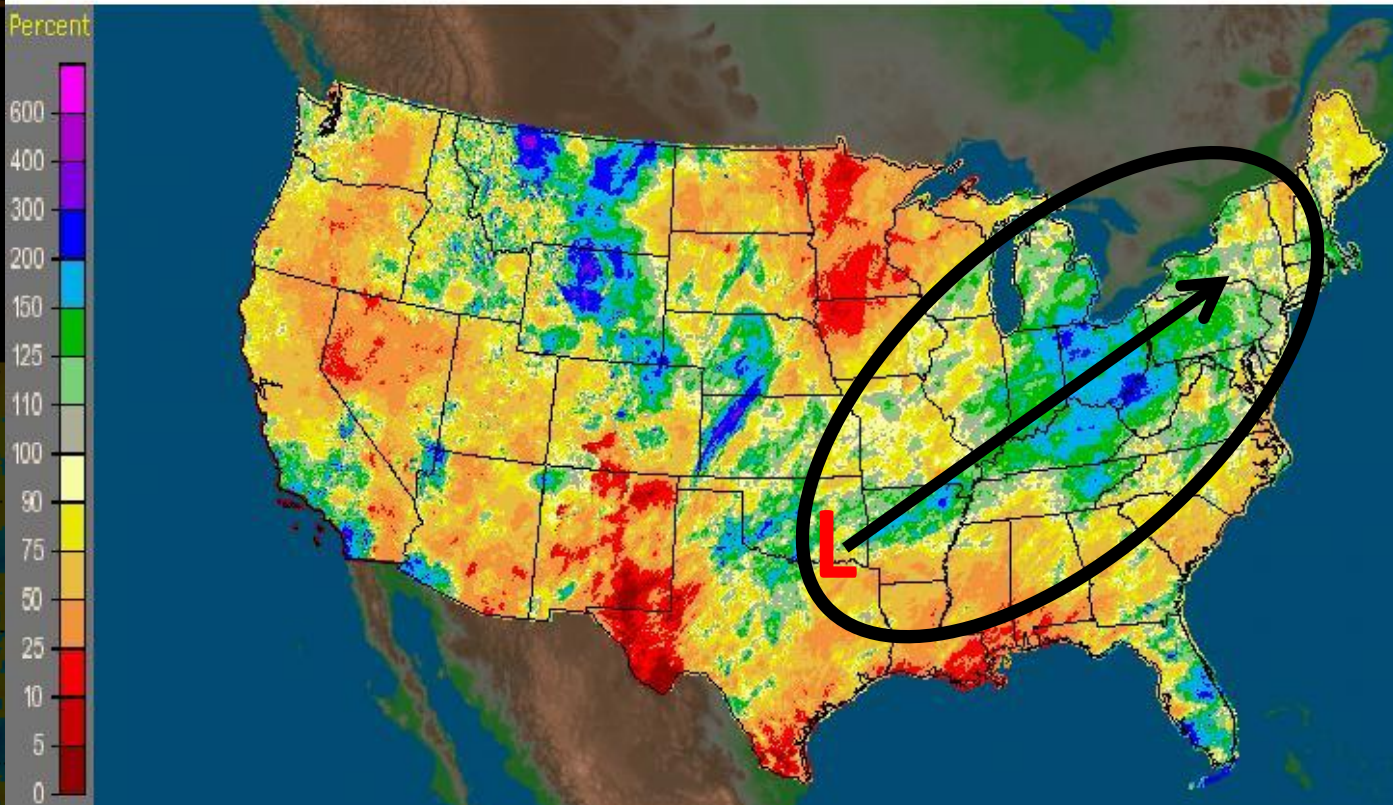


Above is the 90-day “Percent of Normal” precipitation from the record wet spring of 2011. Note the very active storm track up the Ohio Valley, which brought record rainfall to SE Michigan. This pattern is a hallmark of la Nina’s influence.

Recent Trends

Late Autumn 2011 – Look Familiar?

CONUS + Puerto Rico: Current 60-Day Percent of Normal Precipitation
Valid at 11/30/2011 1200 UTC– Created 11/30/11 23:39 UTC



Now pictured above is the 60-day “Percent of Normal” precipitation from Detroit’s record wet autumn of 2011 as of yesterday. Note the return of the active storm track up the Ohio Valley as we head into the early stages of winter.

What is the “Arctic Oscillation” (AO)?

A key unknown for winter 2011-2012

- **Positive phase:** A stronger polar circulation favors stronger westerlies, fewer cold air outbreaks, and a storm track located further to the north (left).
- **Negative phase:** A weaker polar circulation that favors weaker westerlies, more cold air outbreaks, and a storm track located further to the south (right).

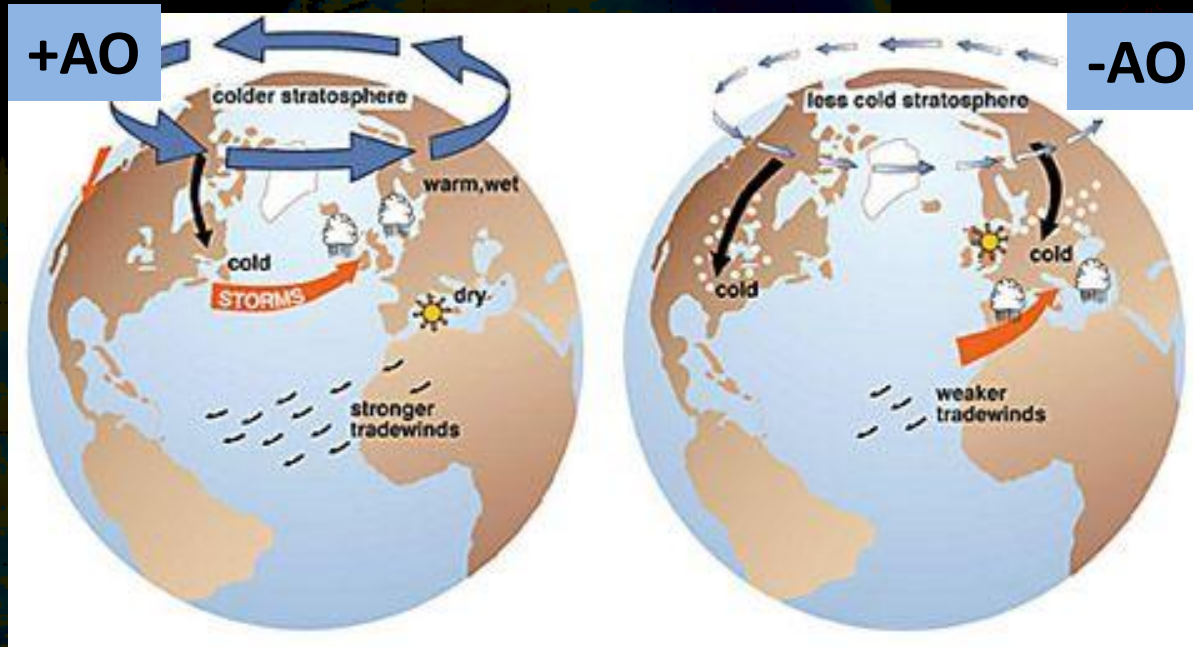
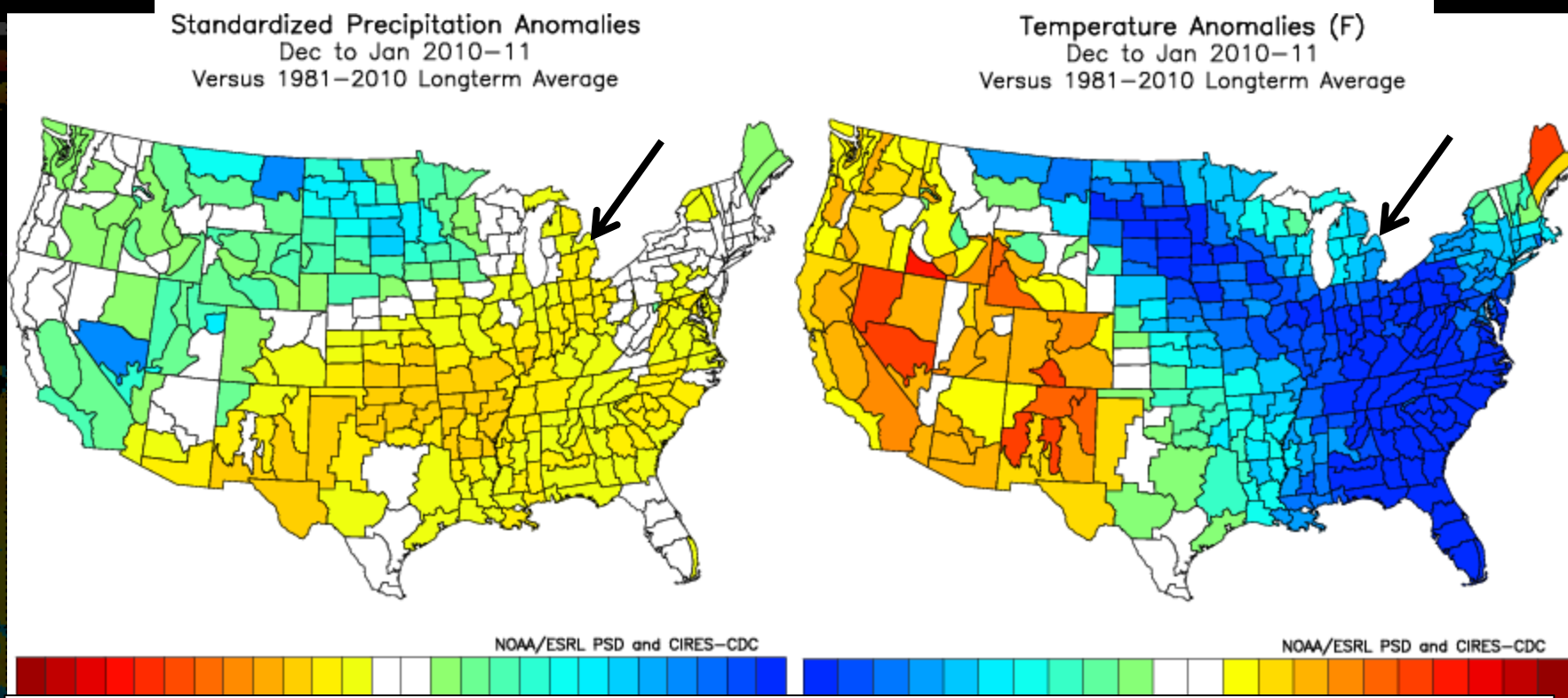


Figure accessible through the National Snow & Ice Data Center [here](#)

Things to know about the AO

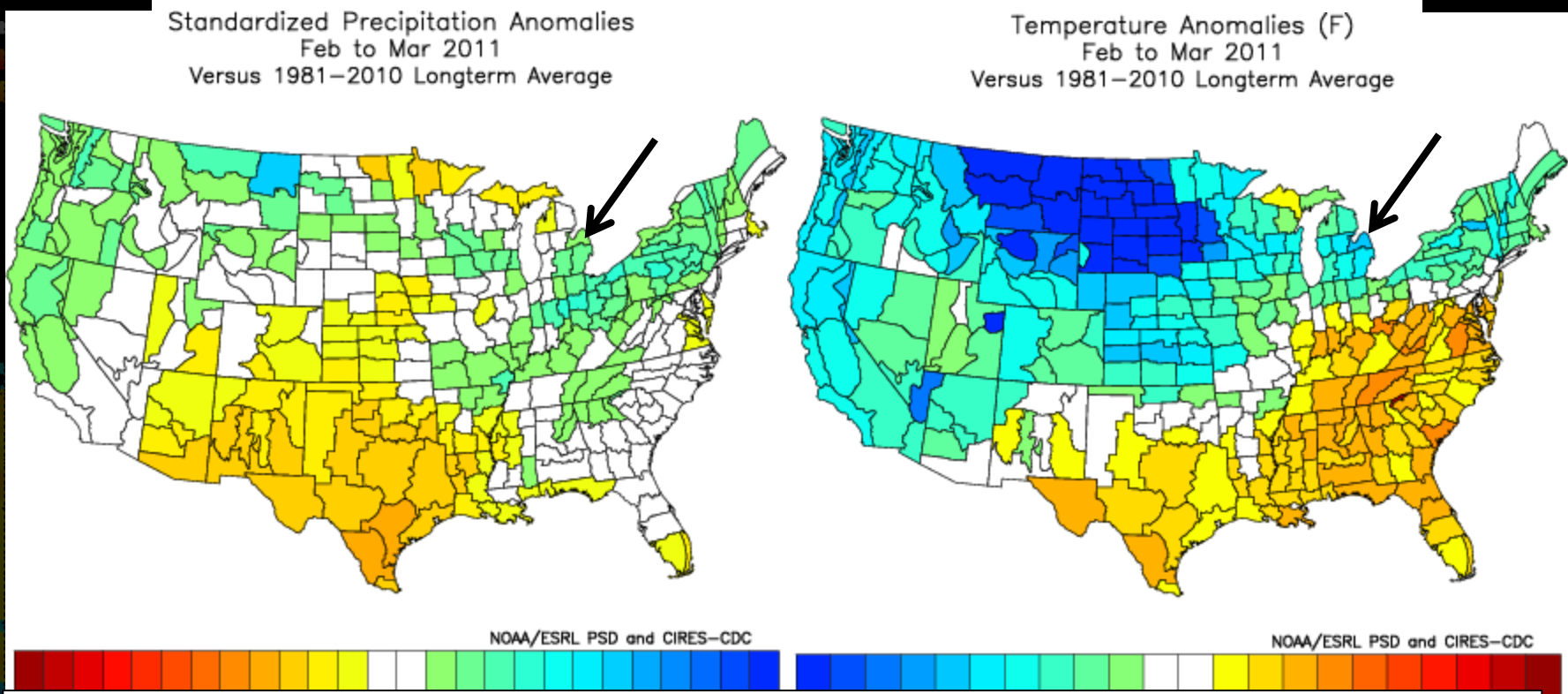
- The AO exhibited record-breaking negative behavior in the winter of 2009-2010. It also displayed strongly negative behavior through much of last winter.
- While it is usually more variable in nature, its strongly negative tendencies over the last two winters have led to a lot of increased attention and thrust it into the spotlight as an important player in the winter weather pattern.
- A la Nina, which we are currently under the influence of, favors a stronger polar circulation, which would seem to be more supportive for a positive AO (that would represent a switch from the last couple of winters). Unfortunately, the atmosphere is more complex than that and history shows that the existence of a la Nina pattern is simply not enough to predict the AO.
- Unfortunately, there are no known good predictors. It is an unknown factor that could have a potentially significant influence.

Exploring the possibilities: la Nina interacts with a -AO (from Dec-Jan of 2010-2011)



December and January of last winter were cold and dry, with frequent (but mostly minor) snowfall events here. This was characteristic of a la Nina combined with a -AO pattern. Notice the slightly below normal precipitation for SE Michigan (left) and the widespread much below normal temperatures (right).

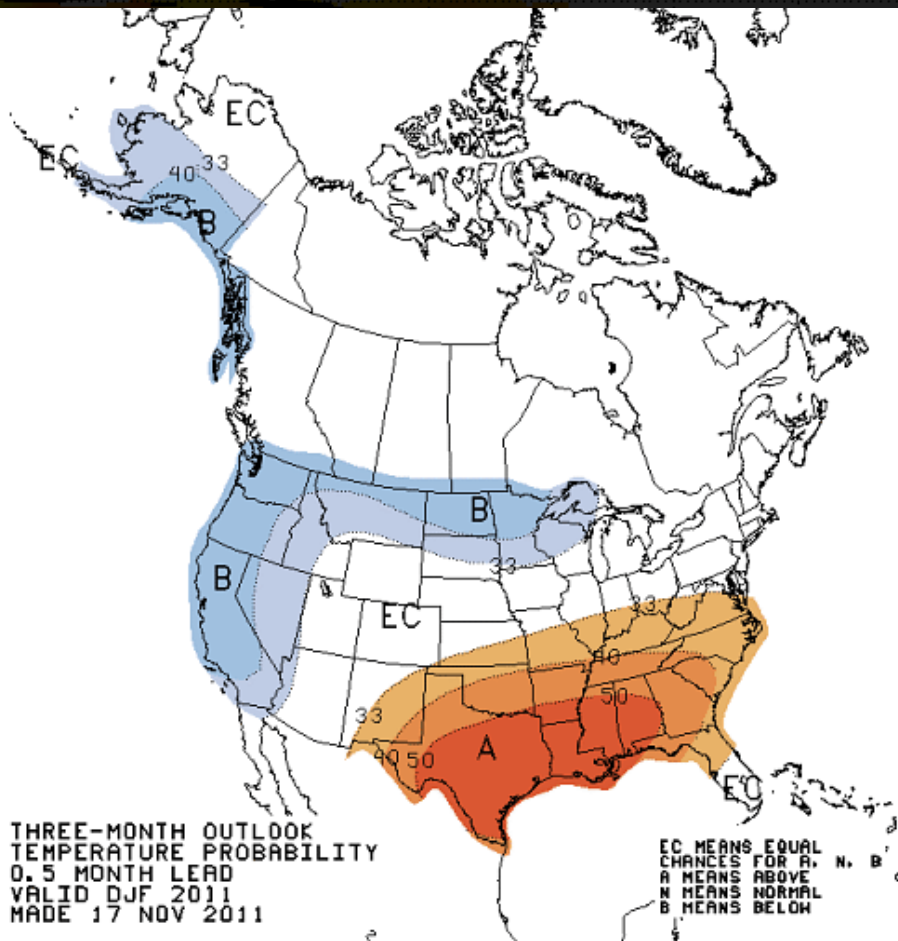
Exploring the possibilities: la Nina interacts with a +AO (from Feb-Mar of 2011)



Late last winter and early spring featured a La Nina combined with a +AO pattern. Notice the much wetter pattern up the Ohio valley , including SE Michigan (left). This pattern produced a very snowy February and a record wet spring. Temperatures stayed below normal, but the big-time cold was not widespread. The active storm track up the Ohio Valley (left) that we experienced is something that has returned recently.

Winter Outlook for DJF 2011-2012

December-January-February



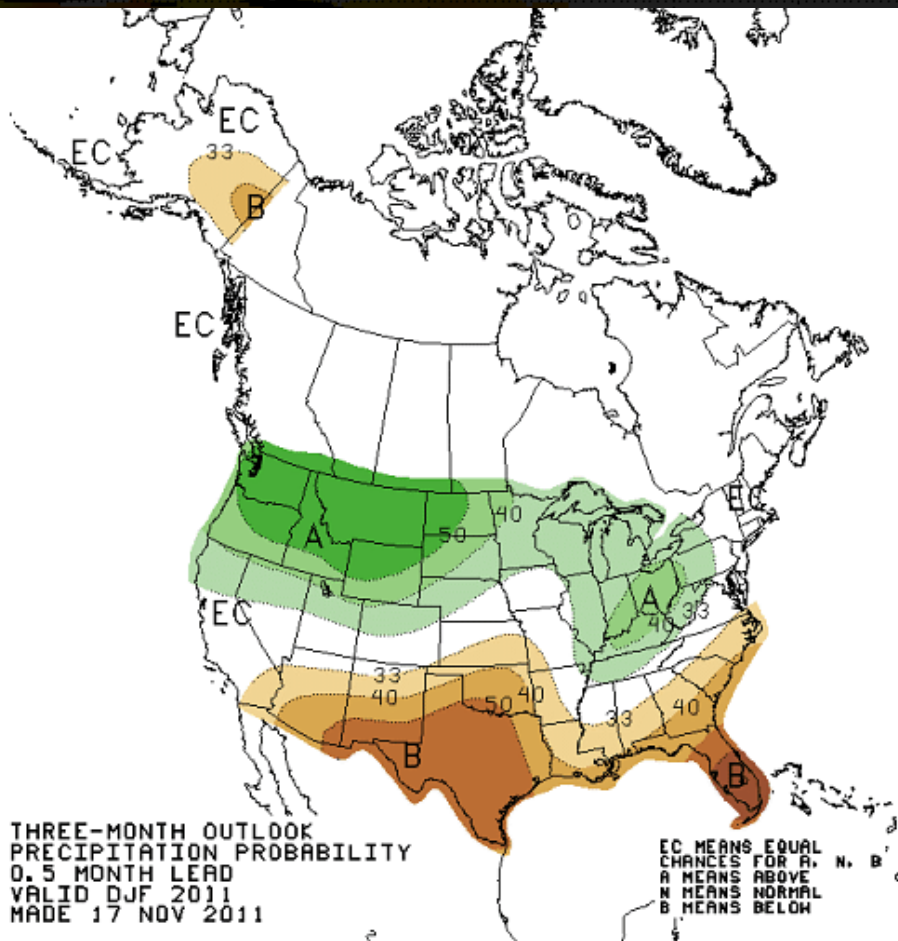
Temperature Trends

Southeast Michigan will be located between the most favored regions for above or below normal temperatures, with no strong signal pointing in either direction.

How does this compare to last winter? The outlook, in a general sense, more closely resembles the latter half of winter, when the pattern was active, but not necessarily colder than normal for prolonged periods.

Winter Outlook for DJF 2011-2012

December-January-February



Precipitation/Snowfall trends

As alluded to earlier (page 4 and 5), a return to the active storm track up the Ohio Valley is probable. Although not explicitly a part of the CPC's outlook, it is worth noting that such a storm track is favorable for an above normal likelihood of high impact snow events in SE Michigan. In other words, we might expect snow to be less frequent, but come in greater bursts.

Winter Trivia for Southeast Michigan

Coldest temperature: **Tri-Cities: -23F** (Feb 1918), **Flint: -25F** (Jan 1976), **Detroit: -21F** (Jan 1984)

Coldest month: **Tri-Cities: 9.4F** (Jan 1912), **Flint: 10.9F** (Jan 1977), **Detroit: 12.2F** (Feb 1875)

Coldest winter: **Tri-Cities: 15.7F** (1962-63), **Flint: 16.7F** (1976-77), **Detroit: 18.8F** (1903-04)

Warmest winter: **Tri-Cities: 33.3F** (1931-32), **Flint: 32.2F** (1982-83), **Detroit: 36.9F** (1881-82)

Snowiest month: **Tri-Cities: 39.3"** (Feb 1908), **Flint: 35.3"** (Dec 2000), **Detroit: 38.4"** (Dec 2000)

Snowiest year: **Tri-Cities: 87.2"** (1966-67), **Flint: 82.9"** (1974-75), **Detroit: 93.6"** (1880-81)

Least snowy year: **Tri-Cities: 7.8"** (1941-42), **Flint: 10.9"** (1921-22), **Detroit: 13.4"** (1936-37)

Heaviest snow storms: **Tri-Cities: 23.8"** (January 26-27, 1967), **Flint: 22.7"** (January 26-27, 1967), **Detroit: 24.5"** (April 6, 1886)

Average first measureable snowfall: **Tri-Cities: Nov 15th**, **Flint: Nov 16th**, **Detroit: Nov 17th**

Average first 1+": **Tri-Cities: Nov 26th**, **Flint: Nov 29th**, **Detroit: Nov 30th**

Average first 3+" snowfall: **Tri-Cities: Dec 27th**, **Flint: Dec 29th**, **Detroit: Dec 26th**